Prevalence of Social Anxiety Disorder and Beta-Blocker Usage among Medical Students: A Cross-Sectional Study

Ibrahim A. Naqid[1], Shah Vahel Ibrahim[2], Nizar Hussein Ibrahim[3], Ahmed A. Mosa[4*], Ali Jotiar Mahmood[5] and Ameen M. Mohammad[6]

[1]Department of Biomedical Sciences, College of Medicine, University of Zakho, Zakho, 42001, Kurdistan Region of Iraq, Iraq
[2-5]Department of Clinical Sciences, College of Medicine, University of Zakho, Zakho, 42001, Kurdistan Region of Iraq, Iraq
[6]Department of Internal Medicine, College of Medicine, University of Duhok, Duhok, 42001, Kurdistan Region of Iraq, Iraq

Author Designation: [1]Assistant Professor, [2,3,4]Doctor of Medicine, [5]Medical Student, [6]Professor

*Corresponding author: Ahmed A. Mosa (e-mail: ehmad.a.mosa@gmail.com).

Abstract **Background and Objectives:** Social Anxiety Disorder (SAD) is a common psychiatric condition characterized by excessive fear of social interaction. It significantly impairs academic and occupational functioning, with individuals frequently avoiding social situations or experiencing distress when exposed to them. Despite the burden of mental health disorders in the Kurdistan Region of Iraq, studies on SAD among medical students remain scarce. In light of this, the present study aimed to assess the prevalence of SAD among medical students in Zakho and Duhok medical colleges and to examine the extent of beta-blocker usage for symptom relief. **Methods:** This cross-sectional study was conducted from 10th October 2024 to 1st February 2025, among medical students in the Kurdistan Region of Iraq. A total of 769 medical students were included in the final analysis. A validated self-administered survey comprising 28 items, structured into four sections; demographic characteristics, academic details, beta blocker usage and Social Phobia Inventory (SPIN) scale, was delivered to students via a pen-and-paper method. Participants' responses were rated using a five-point Likert scale. **Results:** The participants' mean age was 20.61±1.9 SD. Among the participants, 394 (51.8%) were male. The prevalence of SAD was (31.86%), with 148 (19.25%) and 64 (8.32%) of the students reporting mild and moderate forms, respectively. Only 46 (6%) of the students used a beta-blocker and the main reason for their use was to reduce stress and anxiety (60.9%). Older students (OR = 0.662, 95% CI = [0.49-0.90]), those with a negative family history (OR = 0.57, 95% CI = [0.37–0.86]) and clinical stage students (OR = 0.43, 95% CI = [0.30-0.61]) had a lower probability of developing SAD (p-value <0.05). **Conclusion:** Social anxiety disorder was observed in about one-third of medical students, with most cases classified as mild. Beta-blocker usage was infrequent and primarily reported to reduce stress and anxiety. Furthermore, significant associations were found between the presence of SAD and age, stage and family history of SAD.

Key Words Social Anxiety Disorder, Social Phobia Inventory Scale, Beta-Blocker, Psychiatric Disorders, Medical Students, Iraq

INTRODUCTION

Social Anxiety Disorder (SAD), also referred to as social phobia, is defined as an extreme fear or anxiety regarding one or more social circumstances where a person is observed and judged by others, including interpersonal interactions, or performing publicly [1]. People with social anxiety disorders experience a fear that often prevents them from attending school or work. Three primary features differentiate social anxiety from shyness: the extent of disruption of daily activities, the severity of experienced anxiety and fear and the degree of avoidance of certain social situations [2]. Those affected by SAD exhibit both physical and cognitive symptoms, including autonomic responses such as tachycardia, tremors, blushing, a stiff posture and excessive sweating during social interactions [1].

Social anxiety disorder often remains undiagnosed because of the lack of recognition of the condition and individuals' reluctance to seek professional treatment. Among those who do seek help, most report experiencing symptoms for a decade or more before pursuing treatment [3]. People with some degree of social anxiety frequently report lower academic and occupational achievements and are at increased risk for substance misuse [4]. Research has also shown that individuals with SAD often have low self-esteem and a negative body image, which may contribute to alcohol use and increased suicide risk [5].

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A systematic review carried out in 2024 identified widespread psychiatric issues among medical students and junior doctors. This review reported anxiety rates varied from (7.04%) to (88.30%), whereas depression was observed in (11.0%) to (66.5%) of the cases. These results underscore the substantial mental health burden within this population, with depression and social anxiety emerging as the most prevalent conditions [6]. According to a meta-analysis on the global prevalence of anxiety among medical students, approximately one in three medical students experience anxiety, a rate notably higher than that of the general population. The environment of medical education introduces challenges that can exacerbate psychological vulnerabilities due to continuous pressure to meet excellence standards throughout their education [7].

In the Kurdistan Region of Iraq, studies focusing on SAD are limited. In 2016, a study conducted in Erbil revealed that more than (31%) of high school students exhibited symptoms of social phobia. This reflects the significant prevalence of SAD even among younger populations, many of whom remain undiagnosed and untreated [8]. Another study assessing the prevalence of social anxiety among students at the College of Education, University of Garmian, reported that (80%) of their students experienced SAD, with varying degrees of severity, ranging from mild to severe [5]. Although studies specifically focusing on medical students in the Kurdistan Region are scarce, medical students face an increased risk of developing SAD due to the difficult demands of medical education.

Aim of the Study

The primary aims of the current study were to determine the prevalence of SAD among medical students in Zakho and Duhok medical colleges in the Kurdistan Region of Iraq and to evaluate the frequency of beta-blocker consumption to alleviate symptoms.

Secondarily, this study aimed to explore the associations between socio-demographic and academic characteristics and the occurrence of social anxiety disorder, providing insights into potential contributing factors.

METHODS
Study Design and Participants

This cross-sectional study was conducted from 10th October 2024 to 1st February 2025, among medical students in the Kurdistan Region of Iraq. A convenience sampling approach was employed, where only medical students from Zakho Medical College and Duhok Medical College were recruited. During this period, a self-administered questionnaire was distributed among the students using a pen-and-paper method, with a kind reminder sent to encourage participation and maximize the response rate. Among the 1,338 eligible medical students, 846 participated, leading to a response rate of (63.2%). However, following the exclusion of 77 participants who did not meet the inclusion criteria, a total of 769 students were included in the final analysis. This sample size is adequate to represent the targeted population, with a 99% confidence interval, a 5% margin of error and a response distribution of 50%. This was determined via an online calculator (http://www.raosoft.com/samplesize.html). The study protocol was conceptualized and designed according to the Standards for Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) criteria. Figure 1 shows the participant enrollment flowchart.
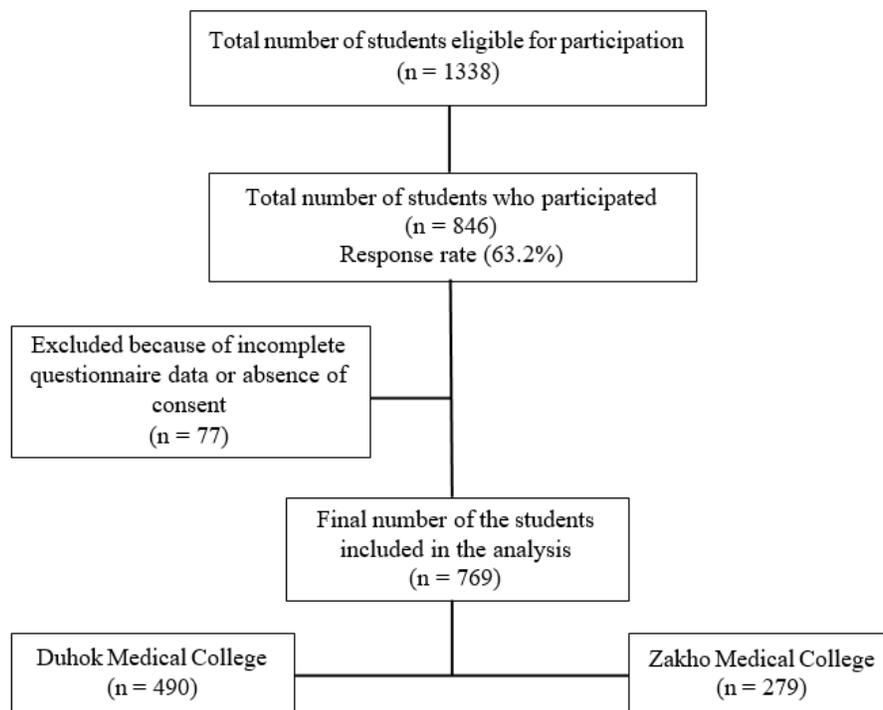

Figure 1: Participant Recruitment Flowchart

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Study Measurements

The study employed a validated self-administered questionnaire, comprising 28 items, structured into four sections for the purpose of data collection. The first section included 5 demographic characteristics of the students, such as age, gender, marital status, family size and family history of SAD. The second part included 3 items about academic information, including college, academic stage and academic performance. The following section comprises three items to assess students' usage of beta-blocker, frequency of usage and reasons for their use.

The final section of the questionnaire utilized the validated Social Phobia Inventory Scale (SPIN), a well-known, valid and reliable tool that was developed by Connor *et al*. [9] for screening and monitoring of SAD. However, the questionnaire underwent a thorough evaluation for cross-cultural adaptation and in the current study the Cronbach's alpha was 0.91, indicating excellent internal consistency. This scale consists of 17 items and participants' responses were rated using a five-point Likert scale, ranging from 0 (not at all) to 4 (extremely), resulting in a total severity score ranging from 0 to 68. Following the summation of all 17 items, the participants were classified into one of the five categories on the basis of their scores; a score of 20 or less indicated the absence of disease, whereas a score above 20 suggested the presence of SAD. SAD is defined as mild for scores between 21-30, moderate for 31-40, severe for 41-50 and very severe for 51 and above.

Inclusion and Exclusion Criteria

The inclusion criteria were limited to students actively enrolled in one of the selected medical colleges, aged over 18 years and who voluntarily gave informed consent to be recruited in the study. Conversely, students who did not provide informed consent, or questionnaires with incomplete data or missing information, were excluded from the study.

Ethical Approval

The study protocol was granted final approval on October 03, 2024, from the Ethics and Scientific Committee of the College of Medicine, University of Zakho, Iraqi Kurdistan, with a reference number (OCT2024/UOZE39). All participants provided written informed consent before enrollment. Data anonymity was protected and the collected data were used exclusively for research purposes. The study strictly adhered to the Helsinki Declaration of Ethical Standards Involving Human Subjects for Medical Research. Clinical trial number: not required.

Statistical Analysis

The study data were entered into Microsoft Excel software, where cleaning and coding of the data was performed. The dataset was subsequently transferred to SPSS version 30 for statistical analysis. The descriptive variables were translated into percentages and frequencies, while the continuous variables were analysed using means and standard deviations. The associations between sociodemographic characteristics and the SPIN score were determined using Chi-Square or Fisher's exact test. Unadjusted and adjusted Odds Ratios (ORs) with 95% Confidence Intervals (CIs) were calculated using binary logistic regression to evaluate correlations between various sociodemographic characteristics and presence/absence of SAD. A p-value <0.05 was regarded as statistically significant.

RESULTS

Sociodemographic Characteristics of the Participants

The participants' mean age was 20.61±1.9 SD. The ratio of males to females was about equal. Approximately, two-thirds (62.5%) of the students had a family size composed of 6 to 10 members. A positive family history of SAD was reported by (14.2%) of the students. Among the respondents, about two-thirds were students from Duhok Medical College and the highest response rate was from the first-stage students. About half of the students reported high academic grades. Sociodemographic characteristics are summarized in Table 1.

Table 1: Sociodemographic Characteristics and Beta Blocker usage of the Study Participants (n = 769)

Variables	n (%)
Age (Year)	
20 and below	408 (53)
21 and above	361 (47)
Mean (SD)	20.61 (1.9)
Gender	
Male	394 (51.24)
Female	375 (48.76)
Marital Status	
Single	756 (98.31)
Married	13 (1.69)
Family Size	
<6	229 (29.78)
6-10	481 (62.55)
>10	59 (7.67)
Family history of social anxiety disorder	
Yes	109 (14.17)
No	660 (85.83)
College	
Zakho Medical College	279 (36.28)
Duhok Medical College	490 (63.72)
Stage	
First stage	212 (27.57)
Second stage	133 (17.30)
Third stage	165 (21.46)
Fourth stage	76 (9.88)
Fifth stage	87 (11.31)
Sixth stage	96 (12.48)
High academic grades (average >70)*	
Yes	369 (56.42)
No	285 (43.58)
Do you use beta blockers for presentations or social events?	
Yes	46 (6)
No	723 (94)
If yes, how often do you need to use it?	
4 and below	32 (69.57)
5 and above	14 (30.43)
Mean (SD)	5.04 (5.68)

*Some first-stage students have not taken the exams and thus did not respond to this question

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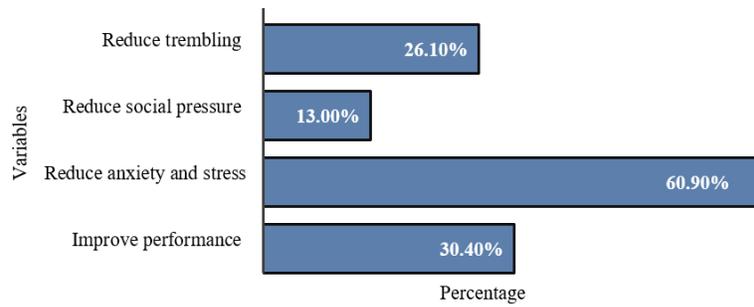
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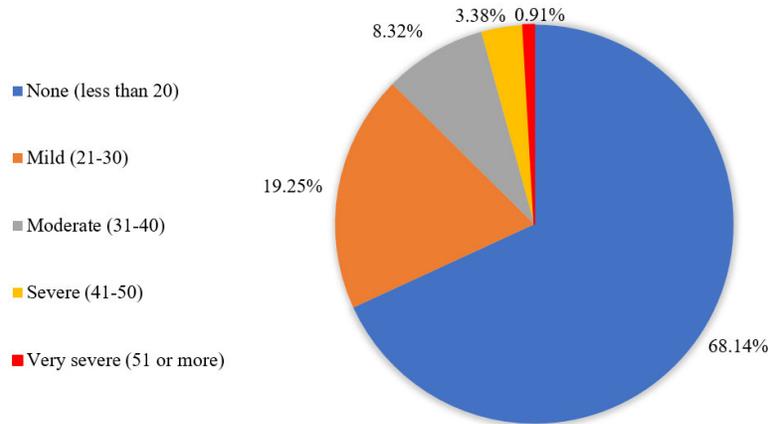Figure 2: Reasons for the use of Beta-Blocker

Figure 3: Severity of Social Anxiety Disorder

Table 2: Correlation between Demographic Variables and Social Anxiety Disorder (n = 769)

Variables	Social Phobia Inventory		p-value
	Absent n (%) 524 (68.15)	Present n (%) 245 (31.86)	
Age (Year)			
20 and below	261 (64)	147 (36)	0.0085
21 and above	263 (72.85)	98 (27.15)	
Gender			
Male	279 (70.81)	115 (29.19)	0.105
Female	245 (65.33)	130 (34.67)	
Marital status			
Single	629 (83.20)	127 (16.80)	0.47
Married	10 (76.92)	3 (23.08)	
Family size			
<6	154 (67.25)	75 (32.75)	
6-10	328 (68.19)	153 (31.81)	0.86
>10	42 (71.19)	17 (28.81)	
Family history of social anxiety disorder			
Yes	62 (56.88)	47 (43.12)	0.0077
No	462 (70)	198 (30)	
College			
Zakho Medical College	180 (64.52)	99 (35.48)	0.11
Duhok Medical College	344 (70.20)	146 (29.80)	
Stage			
Pre-clinical stages	318 (62.35)	192 (37.65)	<0.0001
Clinical stages[a]	206 (79.54)	53 (20.46)	
High academic grades (average >70)*			
Yes	262 (71)	107 (29)	0.20
No	189 (66.32)	96 (33.68)	
Do you use beta blockers for presentations or social events			
Yes	27 (58.70)	19 (41.30)	0.19
No	497 (68.74)	226 (31.26)	
If yes, how often do you need to use it?			
4 and below	20 (62.50)	12 (37.50)	0.52
5 and above	7 (50)	7 (50)	

*Some first-stage students have not taken the exams and thus did not respond to this question, Pre-clinical stages include the 1st stage, 2nd stage and 3rd stage, [a]Clinical stages include the 4th stage, 5th stage and 6th stage

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Table 3: Unadjusted and Adjusted Odds Ratios of Social Anxiety Disorder Prevalence among Study Participants (n = 769)

Variables	Unadjusted OR [95% CI]	Adjusted OR [95% CI]
Age (Year)		
20 and below	Ref	Ref
21 and above	0.662 [0.49-0.90]*	1.23 [0.80-1.90]
Gender		
Male	Ref	Ref
Female	1.29 [0.95-1.75]	1.28 [0.94-1.75]
Family size		
<6	Ref	Ref
6-10	0.96 [0.68-1.34]	0.97 [0.69-1.37]
>10	0.83 [0.44-1.56]	0.85 [0.45-1.62]
Family history of social anxiety disorder		
Yes	Ref	Ref
No	0.57 [0.37-0.86]*	0.60 [0.40-0.93]*
College		
Zakho Medical College	Ref	Ref
Duhok Medical College	0.77 [0.57-1.06]	0.77 [0.55-1.06]
Stage		
Pre-clinical stages	Ref	Ref
Clinical stages	0.43 [0.30-0.61]*	0.36 [0.22-0.58]*

*p-value <0.05

Beta Blocker usage and Reasons

Table 1 shows the frequency of beta-blocker usage. Only (6%) of the study participants used beta blockers. Among those who used beta blockers, about two-thirds (69.5%) reported using them fewer than 5 times. Most of the participants stated that they used beta blockers to reduce anxiety and stress, followed by performance improvement. Figure 2 presents the underlying reasons for beta-blocker use.

Prevalence of Social Anxiety Disorder

The prevalence of SAD among the study participants was as follow: 245 (31.86%) of the respondents had SAD, with 148 (19.25%) experiencing mild symptoms, 64 (8.32%) had a moderate disorder, 26 (3.38%) exhibited severe disease and 7 (0.91%) had a very severe form. Figure 3 illustrates the severity of social anxiety disorders among the students.

Factors Associated with Social Anxiety Disorder

Table 2 illustrates the associations between sociodemographic characteristics and SAD. Social anxiety disorder was significantly more prevalent among younger students (p-value = 0.0085). A family history of SAD was also significantly associated with the disorder (p-value = 0.0077). Compared with clinical stage students, pre-clinical stage students were significantly more likely to experience SAD symptoms (p-value <0.0001).

Determinants of Social Anxiety Disorder

Participants aged 21 years and older were less likely to have SAD than those aged 20 years and younger (unadjusted OR = 0.662, 95% CI = [0.49-0.90]). However, the association was not significant after adjustment of the model (adjusted OR = 1.23, 95% CI = [0.80-1.90]). Those who had a positive family history of SAD were more likely to have the disorder when compared to those with a negative family history, with significant correlation before and after adjustment (unadjusted OR = 0.57, 95% CI = [0.37–0.86] and adjusted OR = 0.60, 95% CI = [0.40–0.93]). Compared

with preclinical students, students in the clinical stages had a lower odds of having SAD before adjustment (unadjusted OR = 0.43, 95% CI = [0.30-0.61]) and after controlling for cofounders (adjusted OR = 0.36, 95% CI = [0.22-0.58]). Table 3 displays the binary logistic regression results before and after adjustment.

DISCUSSION

Medical students are at increased risk of experiencing psychological problems due to high academic requirements, rigorous training and societal changes. SAD is one of the common mental disorders among this population and can have a deleterious impact on the students' quality of life and academic achievements [10]. Thus, it is essential to equip medical students with the necessary professional and communication skills while also supporting their mental and physical well-being, to help them overcome these academic hurdles [11]. To date, no studies have examined the prevalence of SAD among medical students in the Kurdistan Region of Iraq. Therefore, our study is designed to provide insights into the prevalence of SAD and identify possible associated factors contributing to the occurrence of this disorder within the studied population.

The current study demonstrated that approximately one-third of the study participants had SAD. Among these, the majority experienced mild to moderate symptoms, whereas a small proportion experienced severe to very severe symptoms. A Saudi Arabian study carried out among medical students revealed that nearly half of their participants had SAD and experiencing severe and very severe symptoms was more common among their students [12]. A study carried out among nursing students at the Hawler Medical University in Iraqi Kurdistan revealed that about (55%) of their students experienced SAD, which is greater than our results [13]. The lower prevalence of SAD in our study may be attributed to the fact that the institutions of enrolled students implemented a Problem-Based Learning (PBL) method. This approach fosters teamwork and

enhances personal communication through oral presentations, group discussions, oral assessments, daily assignments, symposiums and Objective Structured Clinical Examinations (OSCEs). These ongoing social interactions and public interactivity will likely reduce students' anxiety in both social and clinical settings [14]. However, our findings are in line with a study carried out by Yared Reta *et al*. The Yared's reported that (32.8%) of medical science students in Ethiopia had SAD [15].

In our study, only (6%) of the students reported using beta blockers, which is lower than the findings of two Saudi Arabian studies conducted among health sciences students, which reported that (7.8%) and (14.4%) of their students consumed beta blockers, respectively [16,17]. Moreover, our findings revealed that the most frequent reasons for the use of beta blocker were to reduce anxiety and stress and to improve performance. Our results are in agreement with a study carried out in Saudi Arabia, which reported that stress and anxiety were the most common reasons for the use of beta blockers [17].

Additionally, our study demonstrated that older students were less likely to report SAD symptoms compared with their counterparts. A similar finding was reported by a study conducted among university students in Jordan, which found that SAD symptoms were less prominent in older-aged students [18]. A Nigerian study among undergraduate students in the Faculty of Science and Humanities also reported results that were consistent with our findings [19]. Older students possess greater experience in clinical settings, longer periods of interaction with patients and more advanced communication skills. Moreover, a study has illustrated that older students tend to exhibit a more positive attitude toward improving their communication skills [20]. These factors collectively contribute to the lower prevalence of SAD among older-aged students.

Regarding gender, our study revealed that female students are more likely to experience SAD. This finding is consistent with the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) statement, which states that women are at greater risk of developing SAD [21]. Furthermore, comparable patterns emerged from other studies conducted in neighbouring countries, such as Iraq, Türkiye, Saudi Arabia, Iran and Oman [12,22–25]. The greater prevalence of SAD in females can be effectively understood from a vulnerability-stress perspective. The concept of this model is based on how biopsychosocial factors in women, combined with environmental influences, put this group at greater risk of experiencing anxiety disorders [26]. In our region, cultural norms may have worsened this condition, as females are less likely to engage in social gatherings and often receive inadequate social support from their families.

As anticipated, preclinical students exhibited a significantly higher likelihood of experiencing symptoms of SAD. Research has shown that first and second-stage university students are more susceptible to SAD, possibly because of rapid changes in social environments, living away from their families and being exposed to new unfamiliar social dynamics. Disease onset during this critical period can potentially lead to ongoing negative consequences, affecting students' overall academic performance and long-term psychological well-being [27]. Thus, all universities should implement a strategic plan to provide newly enrolled students with appropriate support and guidance to mitigate these effects and improve their mental well-being.

A family history of SAD was significantly associated with the development of the disease. This finding is in agreement with a study carried out in Türkiye by Alnemr *et al*. [22] which revealed a significant association between the development of SAD and a family history of mental disorders. Similarly, a study in Sweden found that the risk of developing SAD was two-to-three times greater in individuals who had an affected family member [28]. Moreover, a previous study demonstrated a significant correlation between SAD and a personal history of mental disorders [16]. Genetic predisposition has been recognized as a contributing factor to SAD, with evidence-based data indicating that certain genetic components play a role in the development of anxiety disorders [21].

Strengths and Limitations
The present study explores an important topic that has not been previously researched in our region. To our knowledge, this is the first study in the Kurdistan Region of Iraq to thoroughly investigate the prevalence of SAD and beta blocker usage among medical students. However, some limitations exist that need discussion. The self-reported design of the study may have introduced recall bias or erroneous information. Despite the large sample size, a convenience sampling method was used due to limited resources. This limits our ability to generalize the findings to all medical students in the Kurdistan Region of Iraq. Nonetheless, this study will play an important role in directing future research on psychiatric conditions among medical students in our region. Additionally, causal relationships cannot be established due to the cross-sectional design of the study.

CONCLUSION
The present study found that the prevalence of SAD among medical students was (31.86%), with most of the affected cases experiencing mild form of the disorder. The use of beta-blocker among the study participants appeared to be low and was primarily used to manage anxiety and stress. Younger students, those in pre-clinical stages and those with a positive family history of SAD had significantly exhibited higher odds of having SAD compared to their counterparts.

Recommendations
Mental health problems are surrounded by stigma and are often poorly tolerated by individuals in our region. This stigma influences students' willingness to seek social and psychological support when needed, potentially resulting in the exacerbation and deterioration of their conditions.

Universities and colleges should establish a counselling and mental health support center for students to provide them with support during times of distress and to educate students on effective coping mechanisms. Additionally, optimization of the educational environment, curriculum and methods of teaching can further enhance

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students' mental well-being. An increase in these areas will increase students' interest in the teaching process and improve their overall academic performance.

Faculty, teaching staff and mentors should provide students with adequate support and guidance to promote their mental well-being, particularly among students who are at greater risk of psychiatric illnesses. Moreover, it is imperative to foster a strong connection between senior and junior students and facilitate their participation in curricular and extracurricular activities. Exposure to senior students who experienced these challenges will help younger students to effectively handle and overcome these challenges.

Funding

Informed Consent
All participants provided written informed consent prior to their recruitment.

Data Availability
All the data generated or analyzed during this study are included in this published article and its supplementary information files.

Acknowledgement

Conflicts of Interest
The authors declare that they have no competing interests.

Ethical Statement
The study protocol was granted final approval on October 03, 2024, from the Ethics and Scientific Committee of the College of Medicine, University of Zakho, Iraqi Kurdistan, with a reference number (OCT2024/UOZE39).

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